Acta Medica Okayama

Volume 7, *Issue* 4 1942 *Article* 2

AUGUST 1951

Studies on the Helminth Fauna of Japan. : Part 45. Trematodes of Marine Mammals. With 2 Plates.

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Studies on the Helminth Fauna of Japan. Part 45. Trematodes of Marine Mammals.

With 2 Plates.

By

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Received for publication on 15 October 1950.

Contents

CAMPULIDAE Odhner.

1. *Campula oblonga* Cobbold, 1859.

Pl. I, Fig. 1.

Habitat. Biliary ducts of liver of *Phocaenoides dalli.*

Locality. Sea of Japan.

Material. 7 mature specimens fixed in acetic sublimate under cover glass pressure, stained with Heidenhain's hematoxylin and mounted in balsam.

Body fusiform, flattened dorsoventrally, 7.5 – 9.0 mm long by 2 – 2.5 mm broad, covered with spines all over. Oral sucker terminal, 0.27 – 0.35×0.35 – 0.4 mm. Prepharyngeal pouch extending on ventrel side of pharynx to near posterior end of the latter, with folded wall posteriorly. Pharynx flask-shaped, 0.36 – 0.4×0.2 – 0.25 mm. Esophagus very short. Anterior ceca reaching to near posterior end of oral sucker, posterior ceca with numerous outpocket-

ings on each side, extending along lateral edges of body to posterior extremity, where they open into the cloaca by a short narrow passage. Acetabulum 0.46 – 0.55 mm in diameter, situated at posterior end of anterior third of body.

Testes deeply lobed, situated one directly behind the other in middle third of body, 1.3 – 1.95×1.4 – 1.75 mm. Cirrus pouch very much elongated, with thick wall of longitudinal muscles, extending from posterodextral side of acetabulum to genital pore, convoluted distally in front of acetabulum or forming a single loop there when the cirrus is everted, containing long, distally attenuated vesicula seminalis, ductus ejaculatorius and a stout eversible cirrus. Pars prostatica is not distinctly differentiated. Genital pore immediately in front of acetabulum.

Ovary subglobular to oval, 0 36 – 0.48×0.52 – 0.6 mm, situated in medianline or a little to right of it behind acetabulum. Uterus convoluted around acetabulum. Eggs somewhat asymmetrically oval, triangular in cross section, dark brown when mature, 66 – 87× 44 – 54 μ. Vitellaria consisting of branched tubular acini, extending in lateral fields from cervical region to posterior extremity, covering lateral parts of cirrus pouch, ovary and testes both dorsally and ventrally. In the posttesticular region the acini of the two sides are in direct contact in median line, leaving posterior tip of body free.

Excretory vesicle extending in median field as far forward as ovary, narrowed abruptly at posterior extremity and then receiving a narrow cecal duct on each side to form a typical cloaca.

As compared with the descriptions by the previous authors the present worm is larger, probably owing to pressure applied on the cover glass.

Literature.

Braun, M., Uber *Campula oblonga* Cobb. Ctbl. Bakt., I. Orig., 28, 249 – 254, 1900. — Ozaki, Y., Trematode parasites of Indian Porpoise *Neophocaena phocaenoides* Gray. Jour. Sci. Hirosima Univ., Ser. B, Div. 1, Vol. 3, Art. 11, 123 – 130, 1935. — Price, E. W., The trematode parasites of marine mammals. Proc. U. S Nat. Mus., 81 (13), 1932.

2. *Hadwenius nipponicus* n. sp.

Pl. II, Fig. 3.

Habitat. Small intestine of *Phocaenoides dalli.*
Locality Sea of Japan.
Material. Two gravid specimens fixed in acetic sublimate under a cover slip, stained and mounted.

Body slender, cylindrical, 17.5 – 22 mm long by 0.95 – 1.25 mm broad. Cuticle beset with spines from anterior extremity to anterior part of hindbody. Oral sucker ventroterminal, cup-shaped, 0.9 – 1.0×0.8 mm, with greatest diameter at middle of its anteroventrally directed aperture, distinctly truncated at somewhat prolonged posterior end. Prepharynx very long. Pharynx globular, 0.36 – 0.4×0.35 – 0.36 mm. Esophagus practically lacking. Anterior intestinal ceca simple, extending to posterior end of oral sucker, posterior ceca without outpocketings, opening into excretory pore from the two sides. Acetabulum 0.7 – 0.75 mm in diameter, situated at middle of anterior third of body or a little in front of it.

Testes elliptical, with entire or somewhat indented margin, 0.9 – 1.15×0.5 – 0.63 mm, placed one immediately behind the other with the long axis more or less oblique to that of body at or near junction of anterior two thirds of body; in the type the anterior testis lies just at this junction, in the paratype however the posterior testis crosses the junction at its posterior end. Cirrus pouch club-shaped, 1.55 – 2.0 mm long by 0.27 – 0.3 mm broad, extending backwards about half the distance between acetabulum and ovary or a little less. Vesicula seminalis appearing as if it were compressed anteroposteriorly, filling up posterior end of cirrus pouch, surrounded by prostate cells at its tapering anterior portion; pars prostatica 0.7 mm long and 0.1 mm wide at posterior end in the type 17.5 mm long, separated from vesicula seminalis by a sharp constriction, slightly attenuated anteriorly and imperceptibly continued into ductus ejaculatorius, which is only 0.18 mm long and 20 μ wide just before leading into cirrus. Latter funnel-shaped, 0.21 mm long, 0.1 mm wide at its opening into genital sinus from the left side, covered inside with acicular spines. Genital pore immediately in front of acetabulum.

Ovary subglobular, 0.35 – 0.38×0.27 – 0.3 mm, situated anterolateral to anterior testis a little to right of median line. Laurer's canal forming a loop and opening middorsally at level of shell gland. No receptaculum seminis. Shell gland median, immediately in front of ovary. Uterus winding in intercecal field between shell gland and acetabulum. Metraterm running alongside cirrus pouch, unarmed, opening into genital sinus at its anterodorsal wall. Eggs 80 – 90 × 45 – 50 μ, triangular in cross section, thick-walled, light brown, somewhat truncated at opercular pole, knobbed at opposite pole. Vitellaria consisting of rosette-like clusters of dendritic tubular acini, commencing at level of middle of posterior testis or of posterior end of anterior testis, terminating short of posterior extremity, surrounding ceca and confluent in intercecal field;

in the paratype the anteriormost rosette is distinctly separated from the rest, though continuous in the type. Vitelline ducts running forwards on dorsal surface of ceca and turning inwards at nearly right angles before emptying into vitelline reservoir, the left one crossing anterior testis dorsally. Vitelline reservoir elongated pyriform, intercalated between ovary and anterior testis, 0.16 – 0.18 mm wide at its posterior bulbous swelling.

Excretory vesicle tubular, extending in middorsal field from terminal notch to ovary or shell gland. Collecting vessels arising from anterior end of vesicle, turning back on themselves beside oral sucker.

This species differs markedly from the only known genotype in body size. In *H. seymouri* Price, 1932, from *Delphinapterus leucas* the body is 27 – 60 mm long by 1.5 – 2.0 mm broad, and the suckers as well as the internal organs except the length of the cirrus pouch and ovary are distinctly larger than in the present species as shown in the following table (measurements in mm).

Species	*H. seymouri*	*H. nipponicus*
Body	27 – 60 × 1.5 – 2.0	17.5 – 22 × 0.95 – 1.25
Oral sucker	1.8 – 2.0 × 1.7 – 2.0	0.9 – 1.0 × 0.8
Pharynx	0.9 – 1.0 × 0.62 – 0.9	0.36 – 0.4 × 0.35 – 0.36
Acetabulum	0.93 – 1.2 × 1.3 – 1.5	0.7 – 0.75
Testes	0.9 – 1.6 × 0.62 – 0.93	0.9 – 1.15 × 0 5 – 0.63
Cirrus pouch	1.8 × 0.56	1.55 – 2.0 × 0.27 – 0.3
Ovary	0.232 – 0.387 × 0.465 – 0.59	0.35 – 0.38 × 0.27 – 0.3
Eggs	0.097 × 0.052	0.08 – 0.09 × 0.045 – 0.05

Price does not mention the presence of a cloaca. It seems certain that the two ducts opening alongside the excretory pore, which are regarded by Price as the optical sections of a gap around the papilla-like excretory prominence, are really the cecal ends. The cloaca is therefore one of the most outstanding features of the genus. In Price's species the testes lie in the anterior fourth of the body, while in the present species they are confined to the second fourth.

Literature.

Price, E. W., The trematode parasites of marine mammals. Proc. U. S. Nat. Mus., 81 (13), 17 – 19, 1932.

NASITREMATIDAE n. fam.

3. *Nasitrema spathulatum* Ozaki, 1935.

Habitat. Accessory nasal sinus of *Neomeris phocaenoides* Gray.

This species was found by Ozaki in the nasal cavity of *Neophoca phocaenoides*, but from my own observation it is certain that the habitual location is the accessory nasal sinus communicating with the nasal cavity.

Body 25–28×3.0–3.2 mm; oral sucker 0.55–0.6×0.65–0.7 mm; pharynx 0.5–0.55×0.35–0.41 mm; acetabulum 0.92–1.0×1.05 mm testes 1.7–2.9×2.3–3.0 mm; vesicula seminalis 0.38–0.5 mm wide; ovary 0.55–0.65×0.75–1.05 mm; eggs triangular in cross section, 81–99×40–51 μ, embryonated in sea water at room temperature (27°–30°) in 7 days.

4. *Nasitrema dalli* n. sp.

Habitat. Accessory nasal sinus of *Phocaenoides dalli.*
Locality. Sea of Japan.
Material. 5 mature specimens and a set of serial transverse sections.

Body spatulate, 8–15 mm in length, 2–3 mm in maximum breadth in uterotesticular zone, behind which it is nearly parallel-sided and terminates bluntly. Cuticle beset throughout with spines up to 33 μ long by 10 μ broad. Oral sucker terminal, inclined ventrally or directed forward, 0.32–0.55×0.55–0.7 mm. Prepharynx short, forming a sheath-like fold when the pharynx projects into the oral sucker Pharynx 0.4–0.5 mm long, pyriform, with a cylindrical lumen at the anterior tapering portion but a triradiate lumen at the posterior bulbous swelling 0.27–0.38 mm in diameter. Esophagus proper practically lacking; intestinal cecum turning back on itself by the side of pharynx, winding, especially in anterior part, terminating at posterior extremity. Acetabulum 0.65–0.95 mm in diameter, situated at about middle of anterior third of body.

Testes directly tandem, occupying second quarter of body, strongly lobed, 0.75–1.85 mm long, covered dorsally by vitellaria, their lateral parts overreaching ceca ventrally. Vesicula seminalis retort-shaped, 0.3–0.45 mm in diamter at posterior swelling, running from dextrodorsal side of acetabulum toward genital pore. Pars prostatica indistinctly marked out from vesicula seminalis, though its muscular wall and prostate cells are well recognizable. Genital atrium sucker-like, 114 μ in diameter in the type, with very

fine radial muscle fibers and a distinct outer limiting membrane, opening just in front of acetabulum.

Ovary consisting of an oval central part and three short digitiform outgrowths, 0.32 – 0.45 mm by 0.7 – 1.1 mm, situated obliquely inside right cecum just in front of anterior testis. Shell gland immediately in front of ovary. Laurer's canal opening in middorsal line at level of vitelline reservoir. There is no true receptaculum seminis, though the germiduct may form a small diverticle just before giving off the Laurer's canal. The uterus, first winding to the left, turns back on itself and proceeding to the right comes to lie immediately behind the seminal vesicle, where it turns to the left and after describing two close coils on the left of the acetabulum returns to the right, and finally opens into the genital atrium on the dorsal side of the male terminal duct. Eggs ellipsoidal, thick-shelled, somewhat flattened at opercular pole, triangular in cross section, 72 – 84×42 – 48 μ. Vitellaria divided into numerous clusters of branched tubular acini, commencing dorsolaterally at a level between acetabulum and ovary, extending almost exclusively on dorsal side in testicular region, behind which they surround the ceca on all sides and meet in the median field both dorsally and ventrally, leaving the extreme posterior end of the body free. There are paired long ascending and short descending vitelline ducts joining together at the level of the vitelline reservoir. Latter pyriform, about 0.16 mm in diameter, dorsolateral to ovary.

Excretory vesicle tubular, reaching to shell gland, funnel-shaped at posterior end. The collateral excretory vesicles as observed in *Nasitrema gondo* have not been made out with certainty.

This species differs from the closely related *Nasitrema gondo* (*vide infra*) in the size of the body and eggs, the structure of the pharynx, the posterior extent of the vesicula seminalis, etc.

5. *Nasitrema sunameri* n. sp.
Pl. II, Fig. 4.

Habitat. Accessory nasal sinus of *Neomeris phocaenoides.*
Locality. Inland Sea.
Material. 6 gravid specimens fixed in acetic sublimate between two slides, stained with carmine and mounted in balsam.

Body lanceolate, 15 – 20 mm in length, with maximum breadth of 3.8 – 4.0 mm in ovariotesticular region, densely covered all over with spines up to 45 μ long. The posttesticular region is distinctly attenuated but not so slender and long as in *Nasitrema spathulatum*

Ozaki, 1935. Subcuticular musculature weakly developed. Oral sucker terminal, inclined ventrally, 0.55 – 0.6 × 0.62 – 0.75 mm. Prepharynx present. Pharynx pyriform, 0.47 – 0.55 × 0.35 – 0.45 mm. Esophagus very short. Ceca first running transversely and then turning back on themselves beside pharynx, descending sinuously to posterior extremity. Acetabulum a short distance behind pharynx, 0.8 – 1.05 mm in diameter.

Testes consisting of irregularly winding, branched, tubular acini, situated one immediately behind the other in pre-equatorial region with the branches overreaching the ceca laterally, measuring 2.5 – 3.8 mm long by 3.1 – 3.5 mm broad. Vas efferens of anterior testis running forward by left end of ovary and dorsal to shell gland, that of posterior testis dorsal to ovary. Vesicula seminalis swollen posteriorly, sigmoid, up to 0.32 – 0.45 mm in diameter. It may extend further back of the acetabulum with the posterior end directed backward or forward. Pars prostatica cylindrical, 60 – 90 μ wide, surrounded by compact mass of gland cells. Cirrus very short. Genital pore median, just preacetabular.

Ovary oblique, developing a few blunt lobes, 0.43 – 0.61 × 1.05 – 1.28 mm, situated slightly to right of median line in front of anterior testis. Shell gland complex anterodorsal to ovary. No receptaculum seminis. Laurer's canal opening middorsally at level of ovary. Uterus winding in intercecal field between ovary and vesicula seminalis and then on the left, finally running dorsal to acetabulum. Eggs elliptical or oval, with a knob-like thickening at antiopercular pole, indistinctly triangular in cross section; 81 – 90 × 42 – 60 μ; fully matured ovum develops into an oculate miracidium in sea water at room temperature (27° – 30°) in 7 days. Vitellaria of each side divided into a number of bunches of dendritic narrow tubular acini, commencing at a preacetabular level and terminating at posterior extremity or short of it, extending from lateral field toward dorsal and ventral sides overlapping uterus, ovary and testes. In the posttesticular field they occupy the entire peripheral area inclosing ceca and excretory vesicle. The shorter anterior collecting vitelline duct with 6 bunches descends on the dorsal side of the intestine, while the posterior duct with about 36 bunches ascends dorsal or medial to the intestine and dorsal to the testes, both uniting together at the level of the ovary or behind it to form a transverse duct. Vitelline reservoir variable in shape, 0.21 – 0.45 × 0.12 – 0.35 mm, dorsal, mediodorsal or posterodorsal to ovary.

Excretory vesicle tubular, sinuous, with terminal pore, extending as far forward as posterior end of ovary.

This species differs from the most closely related *Nasitrema*

dalli in the anterior extent of the vitellaria, and from *N. spathulatum* Ozaki, 1935, in shape and size of the body. In Ozaki's species the posttesticular region is slender and very long in relation to the other portion, and the testes, misinterpreted by Ozaki as divided into numerous follicles, lie far in front of the equator.

6. *Nasitrema gondo* n. sp.
Pl. II, Fig. 5.

Habitat. Accessory nasal sinus of *Globiocephalus scammoni* Cope.

Locality. Taizi, Wakayama Prefecture.

Body subcylindrical, somewhat flattened dorsoventrally at posterior part, 28 – 35 mm in length, with maximum breadth of 5 mm in acetabulotesticular region in flattened whole mounts; forebody conical, with prominent oral sucker at tip, hindbody nearly uniform in breadth, with rounded extremity. Cuticle very thick (up to 15 μ), beset throughout with spines up to 50 μ long. Subcuticular longitudinal muscle fibers strongly developed in anterior part of body.

Oral sucker terminal, inclined ventrally, 0.75 – 0.85×0.95 – 1.1 mm. Prepharynx forming a sheath-like fold around anterior part of pharynx. Pharynx elongate oval or elliptical, more or less projecting into oral sucker, 0.7 – 0.8 × 0.4 – 0.45 mm, inclosed in a sheath of strong longitudinal muscle fibers. Esophagus inverted T-shaped, with a comparatively thin layer of longitudinal muscles and a thick cuticular lining, surrounded by accompanying cells; stem or esophagus proper very short, arms 0.4 – 0.5 mm long, directed forwards and outwards. Ceca turning abruptly backwards at commencement, undulating throughout, especially in testicular region, terminating at posterior extremity, lined with very tall villous epithelia. Surrounding the muscular wall which consists of circular and longitudinal fibers is an inner layer of compact fibrous tissue and an outer layer of closely massed parenchymatous nuclei. Acetabulum 1.15 mm in diameter, situated at about middle of anterior third of body.

Testes directly tandem, occupying second quarter of body, each consisting of a central body and several arms with short digitiform outgrowths; the central body lies in the ventral intercecal field, covered up dorsally by the vitellaria; the arms are mostly constricted at the base and extend outwards crossing the intestinal ceca ventrally, partly on their dorsal side; the terminal digitations lie in the extracecal fields except for those sent out from the an

terior and posterior arms. Each vas efferens arises from the median dorsal surface of the testis and proceeds forwards, the anterior dorsal to the ovary, the posterior on the left of it, the two ducts unite together dorsal to the uterine coils to form a short vas deferens which enters the vesicula seminalis at its posterior end. Vesicula seminalis long, twisted, enlarged posteriorly, running on dextrodorsal side of acetabulum and a considerable distance further backwards, with maximum diameter of 0.5 – 0.8 mm at posterior swelling. Its wall consists of a thin muscular coat and a distinct epithelial lining. The cylindrical muscular pars prostatica, up to 0.13 mm in diameter and surrounded by a very thick layer of prostate cells, lies obliquely ventrodextral to the metraterm in front of the acetabulum and opens into the genital atrium by way of a very short narrow cirrus. The latter is only 30 μ in diameter and lined with thick cuticle. The fairly wide genital atrium lined with thick cuticle and surrounded by accompanying cells, opens to the exterior immediately in front of the acetabulum.

Ovary divided into a number (10 – 20) of rounded, pyriform, or short digitiform lobules, situated obliquely inside right cecum immediately in front of anterior testis with its long axis at an angle of about 45° to that of body. The germiduct, arising from the dorsal side of the central portion of the ovary, runns toward the left and soon after giving rise to the Laurer's canal joins the vitelline reservoir. The Laurer's canal runns backward and opens on the middorsal surface at the level of the posterior part of the ovary. The ootype and shell gland lie in the median field on the left of the ovary. Uterus lined with a layer of ciliated epithelia, distended with eggs and spermatozoa, coiled from side to side in intercecal field between ovary and genital pore, sometimes overreaching ceca ventrally. Metraterm provided with well developed inner circular and outer longitudinal muscles and surrounded by accompanying cells, extending from dorsal side of acetabulum to genital atrium. Mature eggs triangular in cross section, somewhat flattened at operculum, blunt-pointed at antiopercular pole, light brown, 90 – 105×54 – 63 μ in life ; egg shell 5 – 6 μ thick, thicker at antiopercular pole than elsewhere. Immature eggs oval in outline, 72 – 102 × 65 – 72 μ in life. Vitellaria divided into numerous clusters of branched tubular acini, extending usually from a little behind acetabulum to near posterior extremity ; the anterior clusters are exclusively dorsal to the ceca and the lateral branches of the anterior testis, but the remaining part surrounds the lateral branches of the posterior testis dorsally and laterally and partly ventrally, and the posttesticular ceca on all sides except the medial. In the post-

testicular region the clusters are so closely arranged that their number is difficult to count with certainty. The clusters of the two sides are not always on the same level anteriorly; occasionally they commence at the level of the acetabulum on one side, or on a level with the posterior end of this sucker either on both sides or on one side, but they never extend beyond the acetabulum. At the posterior extremity they terminate at about the level of the cecal ends. From each cluster originates an efferent duct and passes medially to open into the collecting duct separately or after it has joined its neighbor. The paired collecting vitelline ducts run parallel to each other on both sides of the median excretory vesicle and turn inwards at the point where they receive the duct from the anteriormost clusters. Vitelline reservoir triangular or pyriform, 0.2 – 0.35 mm in diameter, situated in median line immediately dorsal to left lobule of ovary, with its pointed anterior end directed toward ootype

Excretory vesicle tubular, wide, flattened from side to side, reaching to posterior end of central part of anterior testis or posterior end of shell gland, forming at its posterior end a thick-walled funnel, which is provided with cuticular lining and a coat of longitudinal muscle fibers surrounded by accompanying cells, and opens to the outside at the extreme posterior end of the body. On each side of the body is a wide collateral excretory vesicle reaching to the cervical region and giving off wide dorsal, ventral and lateral branches of varying calibers at irregular intervals. Posteriorly it turns inwards and passing transversely immediately behind the cecal end or crossing it ventrally opens into the main vesicle just at the anterior end of the above mentioned funnel-shaped terminal portion. On the ventral side of each cecum is a long winding excretory tubule, from which a number of simple or branched terminal tubules are given off at intervals. In the testicular region this collecting tubule lies immediately ventral, partly dorsal, to the lateral branches of the testes. In the cervical region it turns dorsad and opens into the anterior end of the collateral vesicle. There are however no collecting vessels arising from the anterior end of the main excretory vesicle as observed by Ozaki in *Nasitrema spathulatum.*

This species differs from *Nasitrema spathulatum* Ozaki, 1935, in the shape and size of the body, the anterior extent of the vitellaria, etc. Ozaki does not mention the presence of paired collateral excretory vesicles, but states that the excretory vesicle divides at its anterior end into two comparatively narrow vessels. In the total mounts of *Nasitrema spathulatum,* for the loan of which

I am greatly indebted to Dr. Y. Ozaki, the branched collateral excretory vesicles and their connection with the main vesicle at the posterior extremity are well recognizable, and the testes are branched just as in the present species, and not divided into follicles. The misinterpretation made by Ozaki in this respect is due to the fact that the branches of the two testes are so closely massed together that their attenuated base is difficult to make out. The vas efferens from the anterior testis passes dorsal to the ovary and that from the posterior testis on the left of it, the two uniting together shortly before opening into the seminal vesicle.

In 1935 Ozaki created a new subfamily Nasitrematinae with *Nasitrema* as type genus and placed it in the Fasciolidae as a fourth subfamily, but this subfamily cannot be included either in the Fasciolidae on account of absence of the cirrus pouch and the different characters of the eggs, or in the Campulidae on account of absence of the anterior intestinal ceca and of the cirrus pouch not to speak of the entirely different excretory system. I prefer to raise it to family rank.

Nasitrematidae n. fam.

Family diagnosis. Large distomes with elongated body. Cuticle spined throughout. Acetabulum near anterior extremity. Intestinal ceca simple, without anterior outgrowth. Testes branched, situated one immediately behind the other in anterior half of body. No cirrus pouch. Vesicula seminalis and pars prostatica strongly developed, free in parenchyma. Cirrus very short. Genital pore immediately pre-acetabular. Ovary branched, immediately pretesticular. No receptaculum seminis. Laurer's canal present. Uterus coiled in preovarian intercecal field. Eggs thick-shelled, flattened at opercular pole, triangular in cross section. Vitellaria lateral, consisting of numerous clusters of tubular acini, occupying most of body length. Excretory vesicle tubular, long, median. A pair of long, branched collateral vesicles extending along each side of body, receiving a collecting vessel at each anterior end in cervical region, opening into main excretory vesicle near terminal excretory pore. Parasites of marine mammals.

Type genus. *Nasitrema* Ozaki, 1935.

The generic diagnosis of *Nasitrema* given by Ozaki is emended as follows :

Nasitrema Ozaki, 1935, emended.

Generic diagnosis. With characters of family. Body nearly cylindrical, more or less swollen in acetabulotesticular region. Oral sucker terminal, prepharynx present, pharynx elongate Esophagus bifurcating immediately behind pharynx into transverse arms ; ceca undulating, terminating blindly at posterior extremity. Testes strongly branched. Vesicula seminalis extending back of

acetabulum. Ovary branched, submedian, intercecal. Vitellaria confined to hindbody or extending a little more into forebody. Eggs large. Parasitic in nasal cavity of marine mammals.

Genotype. *Nasitrema spathulatum* Ozaki, 1935.

Other species. *N. dalli* n. sp.
N. sunameri n. sp.
N. gondo n. sp.

Literature.

Ozaki, Y., Trematode parasites of Indian porpoise *Neophocaena phocaenoides* Gray. Jour Sci. Hirosima Univ., Ser. B, Div. 1, Vol. 3, Art. 1, 131 – 136, 1935.

Explanation of Plates.

Plate I.

Fig. 1. *Campula oblonga* Cobbold, 1858, ventral view.
Fig. 2. *Nasitrema dalli* n. sp., ventral view.

Plate II.

Fig. 3. *Hadwenius nipponicus* n. sp., ventral view.
Fig. 4. *Nasitrema sunameri* n. sp., ventral view.
Fig. 5. *Nasitrema gondo* n. sp., ventral view

Abbreviations used in Figures.

A = acetabulum, AC = anterior intestinal cecum, C = cirrus, CL = cloaca, CV = collateral excretory vesicle, EP = excretory pore, EV = excretory vesicle, GP = genital pore, I = intesine, LC = Laurer's canal, O = ovary, OS = oral sucker, P = pharynx, PP = pre-pharyngeal pouch, PR = prostate cell, SG = shell gland, T = testis, V = excretory vesicle, VS = vesicula seminalis, VT = vitellarium.

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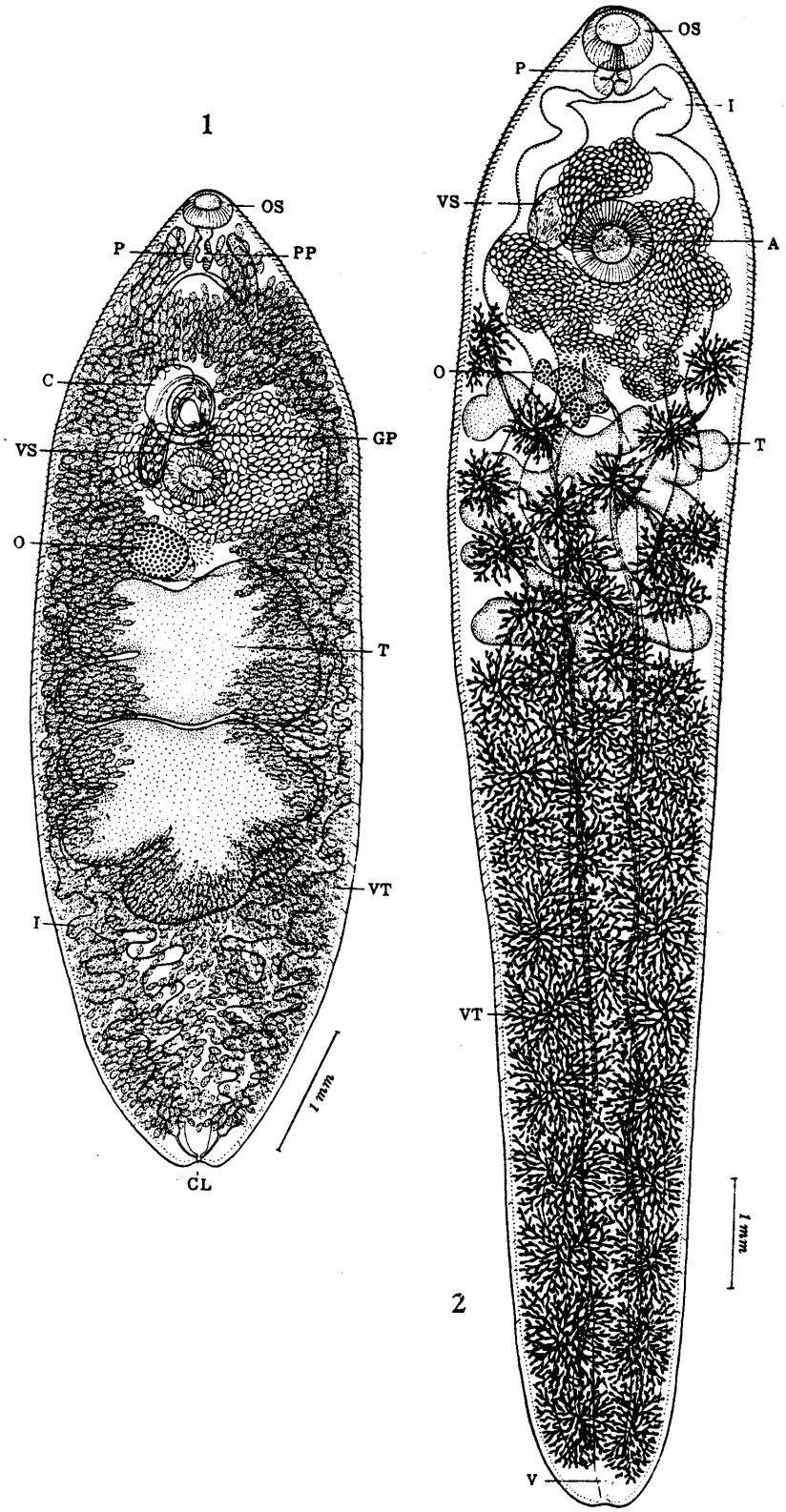

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